SPORT UTILITY SOFT TOP WITH REMOVABLE PANELS

RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Patent Application Serial No. 60/516,645 filed October 31, 2003, which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention. This invention relates to the field of soft tops for sport utility and similar vehicles and more particularly to the field of such tops with removable window and other panels.

2. Discussion of the Background. Vehicle soft tops with removable window and other panels are very popular as they offer the user many options. When in place, the panels serve to protect the user and contents of the vehicle from the elements and when removed allow the user to fully enjoy an open air experience and to readily see and retrieve objects in the vehicle. Such panels are commonly secured in a removable manner to the deck or main body of the soft top with zippers on the sides of the panel. Although zippers are relatively easy to operate, they add expense to the top and can create undesirable waves in the panel, particularly window panels that have a clear plastic film.

More specifically, such removable panels typically have zippers along at least two of their

sides and it often occurs that the two zippers are not perfectly aligned or oriented. Consequently, they do not cooperate together as intended to evenly tension the panel so it will lie flat. This can be due to a number of factors including wear and exposure. It can also be a result of the tracks of each zipper not being originally attached (e.g., sewn) in exact alignment with each other or exact orientation with the tracks of the other zipper. As indicted above, the attached panel then does not lie flat and waves or undulations are created in it which are particularly noticeable in the clear film of a window panel. Such waves detract not only from the overall appearance of the top but also from the viewing through the window panel. With panels secured to the main body of the soft top by three or more zippers along their sides, this problem is only compounded.

With this and other problems in mind, the present invention was developed. In it, an attaching arrangement is provided to easily and quickly secure a removable panel in place with reduced risk that undesirable waves or undulations will be created.

SUMMARY OF THE INVENTION

This invention involves a vehicle soft top with a main body and removable panels. Each panel is at least partially received in a conforming cutout section in the main body. Each panel has a plurality of sides with the upper side preferably secured to the upper side of the cutout section by a pair of interconnecting, sliding members. The interconnecting members have mating hook portions that can be aligned with one another and slid axially relative to each other to hold the upper sides of the panel and main body together. A zipper is preferably used to secure second sides of the panel and cutout section together and the remaining sides are preferably secured together with either belt and channel arrangements or additional zippers.

In use, each removable panel can be easily and quickly secured in place by initially aligning and axially sliding the mating hook portions on the upper sides of the panel and cutout section relative to each other. With the upper sides held together, the zipper along adjacent second sides of the panel and cutout section can be closed. In one embodiment, the third and fourth sides of the panel are then respectively secured by belt and channel members to a vertically extending section of the door frame and a horizontally extending section of the vehicle. In doing so, the interconnecting members along the upper sides of the panel and cutout section are free to axially slide relative to each other in response to uneven tensions or forces created in the panel during the attachment of the remaining sides. The result is that undesirable waves or undulations that often occur in conventional panels (because the upper sides of the panel and cutout section are fixedly secured to each

other as by a zipper) are eliminated or at least greatly reduced. Additionally, the assembly and disassembly time and effort to insert and remove the panel are simplified and cost savings are realized in eliminating a zipper along the upper sides of the panel and cutout section. Such advantages are also realized in other embodiments of the present invention that slidably attach the upper sides of the panel and cutout section together but use attachments other than belt and channel members along the remaining sides.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of a sport utility vehicle with the soft top of the present invention mounted on it.

Figure 2 is a perspective view of the vehicle with the side and rear panels of the soft top removed.

Figure 3 is a view taken along line 3-3 of Figure 1.

Figure 4 illustrates the zipper attachment between the sides of the deck or main body of the soft top and the removable side panel of Figure 1.

Figure 5 is a view taken along line 5-5 of Figure 1.

Figures 6-10 illustrate the assembly steps to secure the removable side panel to the main body of the soft top.

Figure 11 is a side elevational view of a pickup truck with a soft top according to the present invention mounted over its bed.

Figure 12 is a view taken along line 12-12 of Figure 11 showing one of the panels in a rolled up, open position.

Figures 13 and 14 illustrate other designs for the hook portions of the interconnecting members of the present invention.

Figure 15 is a view taken along line 15-15 of Figure 1.

Figure 16 is a view taken along line 16-16 of Figure 1.

DETAILED DESCRIPTION OF THE INVENTION

As shown in Figure 1, the present invention involves a soft top 1 for a sport utility or similar vehicle 2. The illustrated soft top 1 has a deck or main body 3 with removable side and rear panels 5 and 7. Each panel 5 and 7 as shown has a plurality of sides (e.g., four) defining a perimeter shape. The main body 3 of the vehicle soft top 1 in turn has respective cutout sections 5' and 7' (see Figure 2) defined by a plurality of sides to respectively receive the panels 5 and 7. The cutout section 5' in this regard (see again Figure 2) has first and second sides 9' and 11' substantially conforming in shape and orientation to the first and second sides 9 and 11 (Figure 1) of the side panel 5. Similarly, the rear cutout section 7' (Figure 2) has three sides 9', 11', and 13' substantially conforming in shape and orientation to the three sides 9, 11, and 13 of the rear panel 7 (Figure 1). The remaining or lower side 15 of the rear panel 7 as explained in more detail below extends across the tailgate opening above the tailgate 4.

Referring initially to the side or quarter panel 5 of Figure 1 and in the preferred embodiment, the panel 5 is removably secured to the main body 3 of the soft top 1 of Figure 2 along the respective first or upper sides 9 and 9' of the panel 5 and cutout section 5' by a pair of slidably interconnecting members 17 (see Figure 3). The respective second sides 11 and 11' of the panel 5 and main body 3 are then preferably removably secured to each other by a zipper 19 (see Figure 4). The third or left side 13 of the panel 5 in Figure 1 is preferably removably secured to the vertically extending section 6 of the door frame (see Figures

1, 2, and 5) by an arrangement of an elongated belt member 21 and open channel member 23 (Figure 5). The belt member 21 as shown is attached (e.g., sewn) along the third side 13 of the panel 5 which is then receivable in the open channel member 23 on the vertically extending section 6 of frame for the door 10. In a similar manner, the lower or fourth side 15 of the panel 5 in Figure 1 is preferably removably secured to the horizontally extending body section 10 of the vehicle 2 (see again Figure 3) by a belt member 21 and open channel member 23.

In use as illustrated in Figures 6-10, the removable panel 5 can be easily and quickly positioned in place in the cutout section 5' of the main body 3 of the soft top 1. In doing so, the free ends at 25 of the hook portions 27 of the interconnecting members 17 (see Figures 6 and 3) are initially aligned in an overlapping manner. The hook portion 27 attached to the upper side 9 of the panel 5 is then slid along the substantially horizontal axis 29 in Figure 6 relative to the upper side 9' of the main body 3 from the position of Figure 6 to that of Figure 7. In the position of Figure 7, the upper sides 9,9' of the panel 5 and main body 3 are aligned and secured together by the overlapping and mating hook portions 27 of the interconnecting member 17 (see also Figure 3). The elongated hook portions 27 in this regard extend along respective axes 29, which axes 29 are substantially collinear in the overlapping position of Figure 7. The stem portions 31 of the interconnecting members 17 (see again Figure 3) are attached (e.g., sewn) along the respective sides 9,9' of the panel 5 and main body 3. Both the stem 31 and hook 27 portions are preferably elongated as best seen in Figure 6 in respective directions along the sides 9 and 9'. If desired, each elongated

member 17 can be a single piece extending along the entire length of the sides 9 and 9' or can be two or more axially aligned sections such as 17' and 17" on side 9' in Figure 6. Multiple sections such as 17' and 17" in Figure 6 can serve to facilitate folding the main body 3 of the soft top 1 into a relatively small shape when not in use. It is also noted at this point that the section 5' of the main body 3 is referred to here and commonly in the industry as a cutout section; however, it can be formed in the original pattern of the main body or in any number of ways beyond being literally cut from the main body.

Referring again to Figure 7 and once in this position with the upper sides 9 and 9' secured together, the right sides 11 and 11' of the panel 5 and main body 3 can be secured together by the zipper 19 as illustrated in Figure 8. At this point, the left side 13 of the panel 5 is preferably still unsecured wherein the left side 13 can then be drawn or pulled to the left in Figure 8 to secure the belt 21 into the open channel member 23 on the vertically extending section 6 of the door frame (see also Figure 5). Similarly, the lower side 15 of the panel 5 can be secured by a belt and channel member arrangement 21,23 to the horizontally extending section 10 of the vehicle 2 in the manner illustrated in Figures 9 and 10. As shown in Figure 9 and in inserting the belt member 21 into the channel member 23, the panel 5 including the clear, flexible plastic window 37 (e.g., polyvinylchloride) is first drawn taut with the belt 21 positioned as illustrated in dotted lines in Figure 9 against the leg 39 of the channel member 23. Using the free end of the leg 39 as a fulcrum, the belt 21 is then manually rotated to align with and be received in the open channel member 23 as shown in solid lines

in Figure 9. This operation is the same as that of the belt 21 and channel member 23 on the sides 13,13' in Figures 5 and 8.

The ability of the hook portions 27 of the interconnecting member 17 on the upper sides 9 and 9' of the panel 5 and main body 3 of the vehicle soft top 1 to axially slide relative to each other offers multiple advantages. Initially as discussed above, it enables the quick and easy securement of the upper sides 9 and 9' together (Figure 6) by a simple alignment and sliding of the members 17 relative to each other. It also serves to hold or hang the panel 5 in place (Figure 7) so the operator is free to use both hands to manipulate the zipper 19 to secure the sides 11 and 11' together (Figure 8). Similarly, the operator can thereafter use both hands to secure the panel sides 13 and 15 to the vehicle 2. Beyond facilitating the attachment of the panel 5 to the main body 3, the ability of the interconnecting member 17 to axially slide relative to each other also aids in removing undesirable waves or undulations in the panel 5, particularly the flexible window 37. More specifically and again referring to Figures 6-10, the panel 5 (whether made of a single piece of flexible materials such as vinyl and canvas or provided with a window 37 or mesh in the middle) has a tendency to fold or wrinkle when untensioned. Consequently, in the position of Figure 7, waves or undulations such as 41 and 43 often appear in the panel 5 including its window 37. However, with the present invention and once the right sides 11 and 11' are secured together by the zipper 19 (Figure 8), the interconnecting members 17 along the upper sides 9 and 9' can slide relative to each other as the panel 5 is drawn taut to the left in Figure 8 and secured to the vertically extending section 6 of the door frame.

This sliding ability of the members 17 essentially allows the panel 5 to be self-centering and will serve to reduce or eliminate many of the waves in the panel 5 of Figure 7 including the vertical waves 41 (compare Figures 7 and 8). The subsequent securement of the lower side 15 of the panel 5 to the horizontally extending section 10 of the vehicle 2 in the manner of Figure 9 will similarly aid in reducing or eliminating the horizontal waves 43 of Figure 8 (compare Figures 8 and 10). The result is a relatively flat, waveless panel 5 (Figure 10).

In contrast, present panels such as 5 are normally fixedly secured in place to the main body 3 in a predetermined position along the upper side 9 (e.g., by a zipper or snaps). Consequently, no physical adjustment or reaction to uneven forces created in the panel 5 is possible to reduce or eliminate undesirable waves as is the case with the sliding members 17 of the present invention. Perfectly aligned zippers or snaps along the sides 9 and 9' can greatly reduce the development of waves. However, such perfect alignments are often difficult to accomplish during mass production of the tops 1, particularly when the zipper tracks are manually sewn in place. Further, as the panel 5 and main body 3 of such tops 1 (e.g., vinyl, canvas, fabric, or similar flexible and foldable materials) age and weather in use, originally perfect alignments may be altered creating uneven tension in the panel 5 producing undesirable waves. Such problems are substantially avoided or eliminated by the present invention. Further, great financial savings are also achieved by eliminating the need for zippers along the upper sides 9 of the panels 5. Additionally, by using the slidable and relatively watertight attachment of the hook portions 27, other inherent disadvantages of zippers are avoided. As

for example, zippers can sometimes be hard to start in cold or bad weather, dirt can foul up the zipper tracks, and water can pass thorough the teeth of the zipper tracks.

The sliding members 17 along the upper sides 9 and 9' of the panel 5 and main body 3 offer similar assembly, cost, and esthetic advantages even when zippers are used on more than one side of the removable panels as illustrated in Figure 11. In the panel 51, for example, zippers are used along opposing, vertical sides 11 and 13. The sides 11 and 13 in this regard are substantially parallel to each other and extend downwardly from the axis 29 of the upper side 9. In operation and in a manner similar to Figures 6-10, the upper sides 9 and 9' of the panel 51 and main body 3' of the soft top 1' of the pickup truck 2' are first aligned and slid into overlapping engagement. The right sides 11,11' and left sides 13,13' are then zippered together in the manner of Figure 8 and the lower panel side 15 subsequently secured to the vehicle 2' by a belt and channel arrangement like 21,23 of Figures 3 and 9. The use of two zippers for panel 51 along sides 11,11' and 13,13' increases the possibility of undesirable waves being created due to misalignment of the tracks of each zipper and of the orientation of the two zippers as originally manufactured or due to aging and wear. However, the ability of the upper sides 9,9' to axially slide relative to each other still permits the panel 51 to adjust or react to uneven tension or forces created in the panel 51 to help center itself and to at least reduce and possibly eliminate unsightly waves. The same is true as to panel 53 in Figure 11 which has zippers along sides 11, 13, and 15 as well as the three sided panel 55 which has zippers along sides 11 and 13. Regardless of the number of sides, the sliding

ability of the upper sides 9,9' is desirable for ease of assembly, cost savings, and reduction or elimination of waves. In most cases, it is anticipated the panels such as 5, 7, 51, and 53 will have four sides with sides 11 and 13 being substantially vertical and parallel to each other. The sides 11 and 13 would also be substantially perpendicular to the horizontally extending sides 9 and 15, which would in turn be substantially parallel to each other. The sides of the cutout section would then correspondingly be oriented.

The substantially identical, elongated hook portions 27 of the interconnection members 17 are preferably interlocking in the manner of Figure 3. Consequently, the members 17 cannot be released or disengaged from each other by moving the members 17 vertically relative to each other in a direction substantially perpendicular to their axes 29 (see also Figure 7). The hook portions 27 in this regard preferably have abutting barbs on the tips (Figure 3) to prevent such movement in addition to having configurations as also illustrated that resist pulling the members 17 vertically apart. In this manner, the sides 9,9' will not be inadvertently dislodged from one another during the assembly steps of Figures 8-10. Also, the flexible panel such as 51 in Figure 11 can then be folded, rolled up, or otherwise collapsed and held in place adjacent the upper side 9' of the main body 3' of the soft top 1' by a tie arrangement such as the hook and loop members 57 of Figure 12.

As discussed above, interlocking hook portions 27 are preferably engaged (and disengaged) by being slid axially relative to each other as in Figures 6 and 7. However, the hook portions such as 27' in Figure 13 could be designed to be engaged by being moved vertically relative to each other in the

orientation of Figure 13. The barbs on the hook tips would then preferably have contacting, slanted sides 59 to facilitate assembly wherein the interfering hook portions 27' would be flexed to pass by one another and spring back into engagement. To disengage, the hook portions 27' could then be slid axially relative to each other. The hook portions could also be barbed and have a non-interference fit to pass by one another without flexing yet not be easily disengaged vertically. The barbed hook portions in this regard would tend to cock or bend axially relative to each other along their lengths and hang up on one another to resist disengagement. The hook portions such as 27" in Figure 14 could also be barbless or otherwise designed to overlap in a non-interference manner so as to be assembled and freely moved apart vertically if desired. Regardless of whether there is an interference fit or non-interference fit between the hook portions, the hook portion on the upper side of the cutout section preferably opens or faces upwardly as illustrated to mate with the downwardly opening or facing hook portion on the upper side of the panel.

Figures 15 and 16 illustrate additional details of the rear panel 7 of Figure 1 and the manner in which it is secured to the vehicle 2 of Figures 1 and 2. More specifically, the central portion of the lower side 15 of the rear panel 7 preferably has a bulb or dowel member 61 (Figure 15) received in an elongated sleeve member 63 extending across the top of the tailgate opening. The ends of the elongated member or crossbar 63 are then supported in clips such as 65 (Figure 16) on each side of the tailgate opening. The bottom edge 67 of the lower side 15 at each end can additionally be drawn taut and secured to the vehicle 2 by belt and channel members 21, 23

as illustrated in Figure 16. The bottom edge 67 of the side 15 could also be secured to the vehicle by other arrangements (e.g., snapped to the tailgate 4) if desired as could the other panels such as 5 and 51. However, belt and channel members 21,23 as illustrated are preferred.

While several embodiments of the present invention have been shown and described in detail, it to be understood that various changes and modifications could be made without departing from the scope of the invention.